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THE IMPACT OF ENVIRONMENTAL CONTAMINATION ON PUBLIC HEALTH AND ENVIRONMENTAL QUALITY IN LA OROYA AND THE MANTARO WATERSHED

A testimony presented by
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This testimony summarizes the results of research studies conducted by the Saint Louis University School of Public Health in La Oroya and the Mantaro watershed in central Peru. The purpose of these studies was to determine the levels of toxic metals and other contaminants in the people of La Oroya and to evaluate the effects of exposure to these metals on their health and the quality of their environment. This testimony begins with a list of the key findings and its implications for public health and environmental protection, and is followed by a more detailed discussion of the background of these studies and their results.

This testimony is consistent with the Jesuit values of solidarity and service that guide education and research at Saint Louis University and with the School of Public Health' mission to use teaching and research to improve the health and well-being of all.

(1) KEY FINDINGS

Results of the 2004-2005 study entitled "Environmental Contamination in the Homes of La Oroya and Concepcion, Peru, and its Effects in the Health of Community Residents" conducted by the Saint Louis University School of Public Health:

- In La Oroya, 97% of children between 6 months and six years of age, and 98% of children between 7 and 12 years have elevated blls in La Oroya and 100% in La Oroya Antigua.
- La Oroya's population levels for many of the metals considered most toxic are more than three to six times the U.S. average, and urine cadmium more than six times the U.S. average.
- The mean urinary arsenic level for every age group in La Oroya is 50 ug/L or greater, up to 4 times greater for children under 6 years. Arsenic urinary levels considered of concern are those greater than 50 ug/L.

- Elevated blood leads, and other metals, were also found in Concepción, the control site. These results suggest that the problem of environmental contamination is not confined to La Oroya but extends to the Mantaro watershed.
- The levels of toxic metals found in La Oroya and Concepcion can be attributed to the Doe Run Peru smelting complex, the primary source of lead, arsenic and cadmium contamination located in La Oroya.

Results of the 2008-2012 "Mantaro Lives Again" environmental assessment of air, water and soil indicators in La Oroya and the Mantaro watershed.

Soil assessment results:

- Lead and arsenic were found in almost every sampling site in the Mantaro watershed. These and other metals are related to mining and smelting activities.
- Arsenic exceeded significantly Canada's standards in every sampling site. Lead exceeded Canada's standards in 49% of sites (Peru does not have soil standards).
- Also, these metals were found in water used to irrigate the agricultural land of the Mantaro valley. Lead can be absorbed by plants used for animal and human consumption.
- The most critical areas for lead and arsenic in soil are in La Oroya.

Water assessment results:

- Only 8 streams in the Mantaro watershed area remain relatively uncontaminated. The rest, 45 sampling sites, showed various degrees of contamination.
- Elevated levels of metals were found in water sites near mining and smelting areas in the upper watershed.
- The highest levels of lead and arsenic were found in the Mantaro river in La Oroya. The lead levels in water were 20 times and the arsenic levels were 12 times over the Peruvian standards near the Doe Run Peru slag deposits in La Oroya.

Air assessment results:

- Elevated levels of sulphur dioxide (SO2) and toxic metals such as lead, arsenic and cadmium were found in La Oroya. Most of these pollutants come from the main stack and fugitive emissions of the Doe Run Peru smelter in La Oroya.
- These pollutants are transported by the wind thereby affecting air quality throughout the Mantaro watershed.
- Air monitoring showed a significant decrease of air pollutants after the closure of the Doe Run smelter in La Oroya in July 2009. SO2 decreased by 99%; lead decreased by 98%; arsenic decreased by 99%; and cadmium decreased by 93%.

Results of recent evidence of blood lead levels in La Oroya.

- Air pollution has decreased significantly after the Doe Run Peru smelter closed in July 2009. As a result, elevated blood lead levels in children have decreased to levels never seen before since childhood lead screening began in La Oroya.
- However, there are still children (and other age groups) with elevated blood lead levels probably due to lead in soil and dust in La Oroya.
- So, although the air is cleaner in La Oroya, health risks persist due to the contamination of water and soil by toxic metals and to the effects of chronic exposure to lead by the La Oroya population.

(2) IMPLICATIONS

The research results discussed above provide scientific evidence of the grave threat to the health of the people of La Oroya and their environment caused primarily by environmental pollutants such as lead, arsenic, cadmium, sulphur dioxide, and other contaminants emitted by the Doe Run Peru smelter in La Oroya.

Of great concern is the increased risk to health associated with exposure to each one of these contaminants, and to the "toxic cocktail," the combined effect of multiple exposures to all these contaminants.

Therefore, in the discussion of the economic, legal and political factors related to the smelting operations of Doe Run Peru in La Oroya, priority should be given to the health needs and rights of the people of La Oroya, especially those most vulnerable such as infants and young children.

Urgent actions are needed to provide care to those already affected, to decrease risk through environmental remediation, and to effectively protect the health of the entire population in La Oroya.

Levels of contamination have fallen dramatically after Doe Run Peru closed the operation of its smelter in La Oroya in July 2009. As a result, for the first time in decades the people of La Oroya are breathing cleaner air and blood lead levels are decreasing significantly. This is an important environmental health gain that should be protected. If the Doe Run Peru smelter is reopened without the strict environmental controls needed to keep contamination from harming people, the people of La Oroya will face the risk of massive recontamination and subsequent increases of the burden of lead, arsenic and cadmium in their lives.

From a public health perspective we must not loose sight of our most fundamental goal of securing the health and well-being of all. "Health is a state of complete physical, mental and social well-being and not merely the absence of disease." "Health is only possible where resources are available to meet human needs and where the living and working environment is protected from life-threatening and health-threatening pollutants, pathogens, and physical hazards" (World Health Organization).

The evidence provided in this testimony sheds light on the enormous distance that still exists between this definition of health and the reality of vulnerability and risk that the people of La Oroya continue to confront.

(3) BACKGROUND

La Oroya, one of the most contaminated towns in the world.

La Oroya is a town of 35,000 inhabitants located in the Peruvian Andes in an area rich in lead, copper, zinc, silver, and gold. The extraction and smelting of these metals has been La Oroya primary economic activity for decades. La Oroya smelting complex, a system of refineries of metal ore, was owned and operated by the Peruvian government until 1997 when it was sold to the Doe Run Company, the largest producer of lead in the U.S. with headquarters in Missouri. La Oroya smelting complex is now known as Doe Run Peru. According to a 2002 Peru's National Council for the Environment report, Doe Run Peru emmitted 3,312 tons/year of particulate matter, 380,136 tons/year of sulphur dioxide, 226 tons/year of nitrogene oxides, 847 tons/year of lead, 423 tons/year of arsenic, and 43 tons/year of cadmium. Based on the quantity and type of emissions the government of Peru determined that the Doe Run Peru smelter complex is the primary source of emissions of lead, arsenic, cadmium and other contaminants.

Prior to the studies done by Saint Louis University, other studies have documented the severe environmental contamination caused by the mining industry in La Oroya. For instance, in 1999 the Peruvian Ministry of Health found that 99.1% of children in La Oroya suffered from lead poisoning and that 20% of these children needed urgent medical care due to the extremely high blood lead levels. Also, a 2002 report entitled "La Oroya Cannot Wait" described the very serious levels of ambient contamination of air, soil, and water in La Oroya. The findings in this report indicated that over 80% of blood lead levels in La Oroya children were two and three times greater than the level of concern of 10 μg/dl established by the CDC in the U.S. In addition, the "La Oroya Cannot Wait" report found that arsenic, cadmium, suspended particles, and sulfur dioxide (SO2) in the air exceeded international acceptable levels that posed serious health risks to the community. Lead, arsenic and cadmium are metals of concern because their toxicity has been scientifically established and is well documented in the medical and public health literature.

Lead has been the most extensively studied metal in toxicology. The harmful effects of lead exposure have been known since antiquity. Figure 1 below summarizes the current evidence on the relationship between levels of lead in the blood measured in micrograms of lead per deciliter of blood (μd/dL) and health effects in children and adults.

Figure 1: Relationship between blood lead levels and health effects in children and adults.

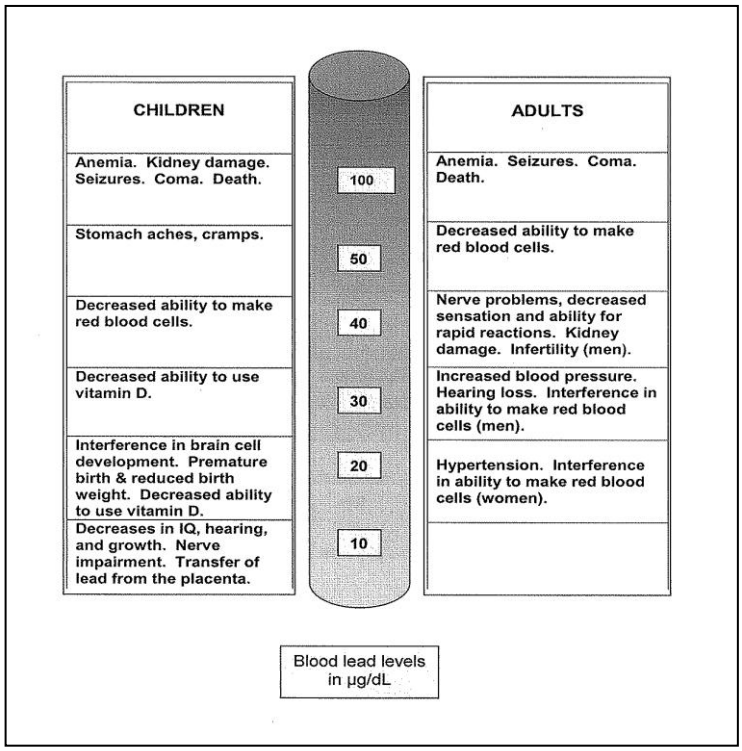


Figure 2 below summarizes the potential carcinogenic and non-carcinogenic effects associated with lead, arsenic and cadmium.

Figure 2: Carcinogenic and non-carcinogenic effects associated with lead, arsenic and cadmium.

Metal of Concern	Potential Health Effects	
	Non-Carcinogenic	Carcinogenic
Lead	Irritibility	Kidney
	Cognitive/Behavioral Dysfunction, Lower IQ	
	Muscle Weakness, Paralysis	
	Coma, Death	
Arsenic	Respiratory Irritation	Lung
	Nausea, Vomitting	Bladder
	Unusual Pattern of Skin Abnormalities -Darkening, Warts, Corns, Lesions	Skin
		Liver
Cadmium	Impaired Kidney Function Leading to Kidney Failure	Lung
	Demineralization of Bone (Density Loss)	Prostate

Source: US Centers for Disease Control & Prevention, Agency for Toxicological Substances & Disease Registry

As concerns began to mount on exposure to toxic metals and other contaminants, local residents and community organizations in La Oroya expressed the urgent need to obtain reliable evidence not only of the levels of lead but also of arsenic, cadmium and other contaminants in the population and in the air, water and soil of the surrounding environment. To address this need the Archdiocese of Huancayo, its archbishop Msgr. Pedro Barreto. S.J., and other community organizations invited the Saint Louis University School of Public Health to conduct an exposure study in La Oroya in 2004 to measure levels of toxic metals in a population sample, and subsequently in 2008, to conduct an environmental assessment to measure levels of toxic metals in the Mantaro watershed, the area surrounding La Oroya. Descriptions and results of these studies are presented below.

Evidence of human exposure to toxic metals and environmental contamination in La Oroya.

In 2004-2005 the School of Public Health at Saint Louis University conducted a scientific study entitled "Environmental Contamination in the Homes of La Oroya and Concepcion, Peru, and its Effects in the Health of Community Residents." This was an exposure study designed to determine the levels of 14 elements including toxic metals such as lead, arsenic and cadmium in blood and urine samples of La Oroya population. This study also evaluated the health risks associated with these metals.

Also, in 2008-2012, the School of Public Health directed the "Mantaro Lives Again," a comprehensive environmental assessment of air, water and soil indicators in La Oroya and the Mantaro watershed. The purpose of this assessment was to measure the presence of toxic metals such as lead, arsenic and

cadmium in air, water and soil samples, and evaluate their impact on public health and environmental quality. I served as the principal investigator in the two studies described above.

These studies have been conducted in partnership with by the Archdiocese of Huancayo, Peru, and other community organizations. The "Environmental Contamination in the Homes of La Oroya and Concepcion, Peru, and its Effects in the Health of Community Residents" study was approved by Saint Louis University's Institutional Review Board and by Peru's Ministry of Health and it complied with all applicable norms and regulations in United States and Peru. Also, the "Mantaro Lives Again" study met all applicable scientific, technical and regulatory requirements applicable to environmental assessments. Following are the results and interpretation of these studies.

(4) LEVELS OF TOXIC METALS IN THE LA OROYA POPULATION

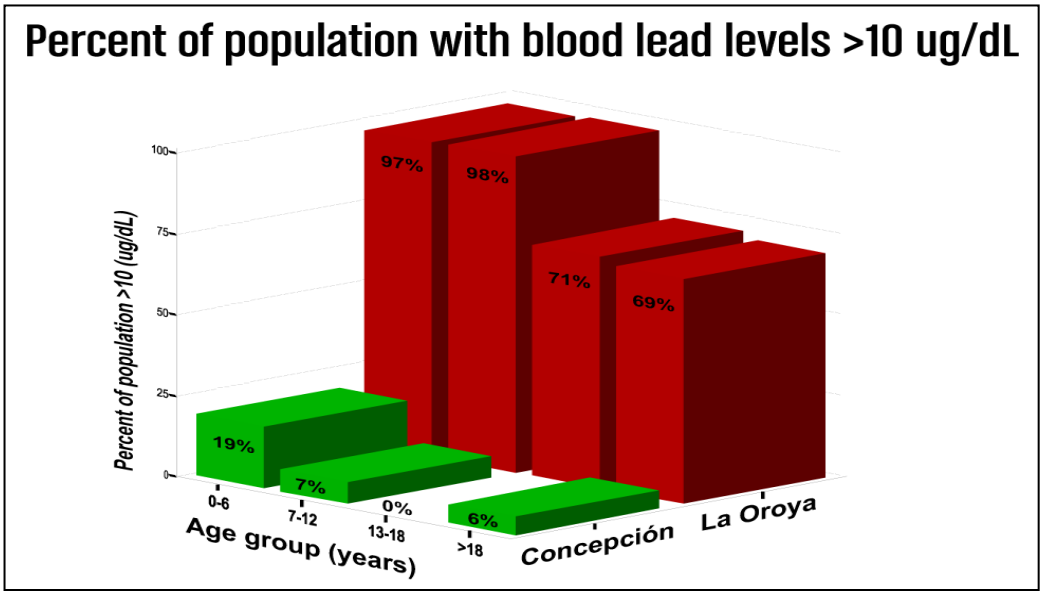
The "Environmental Contamination in the Homes of La Oroya and Concepcion, Peru, and its Effects in the Health of Community Residents" study compared a case site, La Oroya, with a control site, Concepción. La Oroya was selected as the case site because of the serious levels of environmental contamination from lead, arsenic, cadmium and other contaminants produced by the Doe Run-owned metallurgical complex. Concepción was selected as the control site because it has similar characteristics to La Oroya but does not have a metallurgical complex and, therefore, hypothetically, is unlikely to have levels of contamination as serious as those in La Oroya.

In August 2005 Saint Louis University reseachers teamed up with Peruvian physicians and research assistants to collect blood and urine samples to determine levels of toxic metals in the body. The Centers for Disease Control and Prevention, CDC, analyzed these samples and provided the first results of the levels of lead, cadmium, arsenic and other toxic elements found in blood and urine samples of study participants. Following is a summary of the CDC laboratory results of a statistical sample of 350 people from La Oroya and Concepcion.

Levels of lead, arsenic and cadmium found in biological samples.

Figure 3 below shows the percentages of the population in four age groups found with elevated blood lead levels in La Oroya and Concepcion. At the time of the analysis and reporting of these results (2005) an elevated blood lead level was defined as any level equal or greater than 10 micrograms (µg) of lead per deciliter (dL) of blood.

Figure 3: Percentages of the population by age group with elevated blood lead levels in La Oroya and Concepcion.



As figure 3 shows above, 97% of very young children 6 months to 6 years of age, and 98% of children between 7 to 12 years had elevated blood lead levels. The percentages of elevated blood lead levels in the other age groups were also very high: 71% in the 13-18 years age group, and 69% in the older than 18 year age group.

Figure 4 below shows the percentages of blood lead levels found in young children 6 months to 6 years of age in four groups according to the CDC guidelines for lead poisoning prevention and care. These four groups are groups of non-elevated levels (category I: less than 10 µd/dL, the CDC level of concern until 2012); and elevated blood lead levels category II: from 10 to 19 µd/dL; category III: from 20 to 44 µd/dL, and category IV: greater than 45 µd/dL. Less than 3% of the children had elevated blood lead levels in La Oroya. The rest had almost twice the level of concern of 10 µd/dL (16.67%), 2 to 4 times the level of concern (72.22%), and over 4 to almost 7 times the level of concern (8.33%). Regarding Concepcion, the mayority of children did not have elevated blood lead levels (76.19%); however, elevated blood lead levels were found in group 1 from 10 to 19 µd/dL (19.05%) and group 2 from 20 to 44 µd/dL (4.76%).

Figure 4: Blood lead levels in children 6 months to 6 years of age in La Oroya and Concepcion.

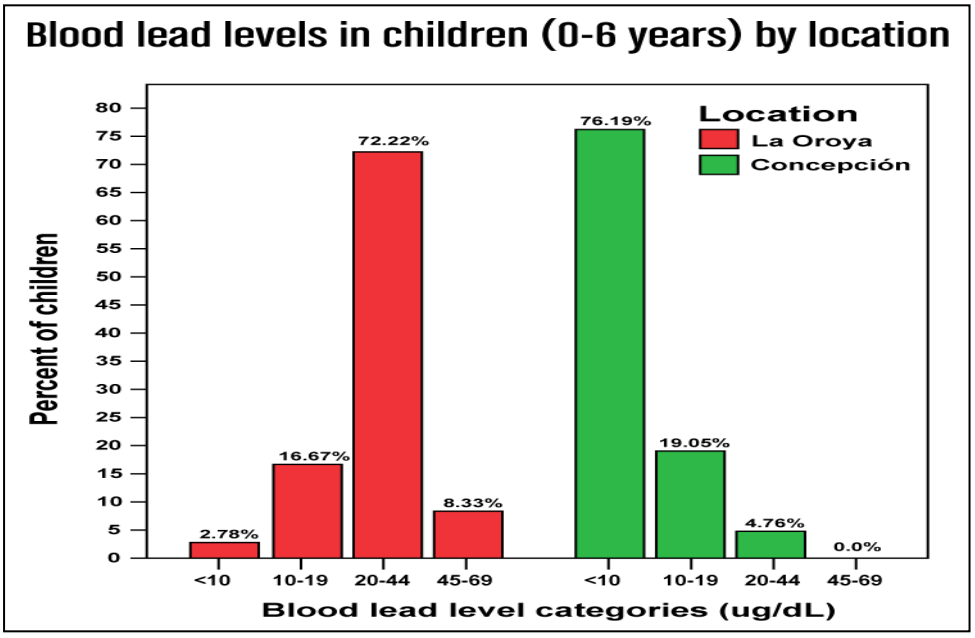


Figure 5 below shows the levels of arsenic found in La Oroya and Concepcion. The levels of arsenic found in La Oroya residents were twice as much as those found in Concepcion, the control site. The mean urinary arsenic level for every age group in La Oroya is 50 ug/L or greater, up to 4 times greater for children under 6 years. Arsenic urinary levels considered of concern are those greater than 50 ug/L. Also, figure 5 shows that the younger age groups have higher levels of arsenic than the other groups, which puts them at a greater risk of arsenic-related disease.

Figure 5: Levels of urine arsenic in La Oroya and Concepcion.

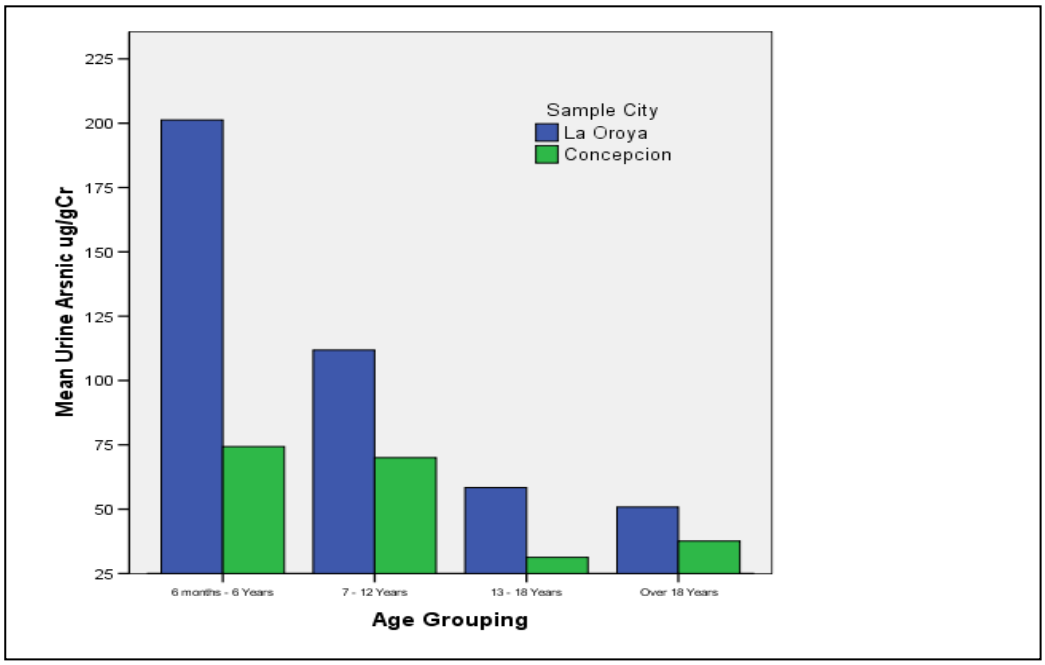
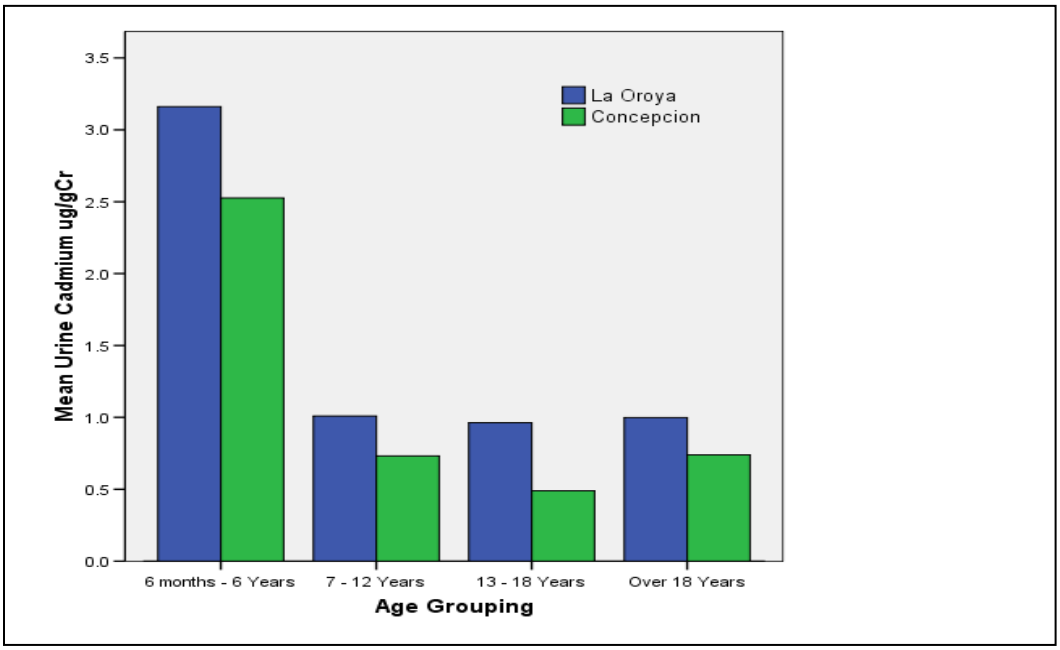


Figure 6 below shows the levels of cadmium in La Oroya and Concepcion. La Oroya's population had blood cadmium levels more than three times the U.S. average, and urine cadmium (reported in this figure) more than six times the U.S. average. The levels of cadmium in the four age groups are greater in La Oroya than in Concepcion. The age group 6 months to 6 years, the youngest and most vulnerable, had 2 to 3 times the levels of cadmium found in the other age groups.

Figure 6: Levels of urine cadmium in La Oroya and Concepcion.



Interpretation of results

1. Confirmation of extremely high blood lead levels.

The results of the "Environmental Contamination in the Homes of La Oroya and Concepcion, Peru, and its Effects in the Health of Community Residents" study confirmed what has been found in previous blood lead screenings: the percentages of children with elevated blood lead levels are extremely high. This study found that 97% of children between 6 months and six years of age and 98% of children between seven and 12 years had elevated blood lead levels. Also this study is the first to report elevated blood lead levels in other age groups. For instance, 71% of children between 13 and 18 years of age, and 69% of residents over 18 had elevated blood lead levels.

It is important to note that from 1991 to 2012 the CDC defined an elevated level is any level equal to or greater than 10 µg/dL. In May 2012 the CDC lowered this level to 5 µg/dl and no longer called it "level of concern" as it recognized that there is no safe level of lead in blood. According to the CDC, a level of 5 µg/dl or greater is an elevated blood lead level and this means that, as more children will likely be identified as having lead in their bodies, parents, doctors, public health officials, and communities may take action earlier to reduce the child's future exposure to lead.

The epidemic of lead exposure was even more serious in La Oroya Antigua, the urban area closest to the Doe Run Peru smelter where 73% of children between 6 months and six years of age were found with levels between 20 and 44 µg/dl, and 23% were found with levels higher than 45 µg/dl. The CDC considers levels equal to or greater than 45µg/dl a medical emergency requiring inmediate medical attention.

2. New evidence of arsenic, cadmium and other toxic elements.

The levels of arsenic found in La Oroya residents are twice as much as those found in Concepcion, the control site. These levels could not be compared to a U.S. average because the CDC has not reported this average. Nevertheless, the health concerns with arsenic remain as it has been shown to cause respiratory problems, skin lesions, nausea and vomiting. Also, lead, cadmium and arsenic have been classified as potentially carcinogenic elements.

La Oroya's population had blood cadmium levels more than three times the U.S. average, and urine cadmium more than six times the U.S. average. Cadmium, a by-product of the smelting process, is a heavy metal that has been associated with lung and prostate cancer and kidney disease and failure.

The "Environmental Contamination in the Homes of La Oroya and Concepcion, Peru, and its Effects in the Health of Community Residents" study found other toxic elements in blood and urine samples such as antimony. The level of antimony in La Oroya's population was thirty times higher than the average level in the U.S. population. Elevated levels of antimony have been shown to cause heart and lung disease, and may be linked to genetic and developmental abnormalities, as well as lung cancer.

3. Exposure to toxic metals found in Concepcion.

The Saint Louis University research team did not expect to find elevated levels of contaminants in Concepción, a city known as the ecological capital of the Mantaro River Valley, which is located 70 miles downriver and downwind from the city of La Oroya. The Mantaro Valley produces a significant portion of the vegetables, grains and dairy products consumed by nine million people in Lima, Peru's capital.

However, the study results indicate elevated levels of lead in Concepción. Approximately 24% of children between six months and six years of age have elevated blood lead levels. Also, Concepción's population showed cadmium levels a full 50% above the U.S. average level.

These results suggest that the problem of environmental contamination and its effects in community health is not confined to La Oroya but has a regional scope reaching large areas of the Mantaro River watershed.

4. The concern with multiple exposure to toxic metals.

The levels of toxic metals and other elements found in blood and urine samples in La Oroya and Concepcion raises the question and concern of health effects due to the multiple exposure to these elements. Individually, the heavy metals analyzed in this study are capable of causing significant harm. When taken together, in what La Oroya residents call their daily **"toxic cocktail,"** it is reasonable to expect that the combined action of these heavy metals can increase the health risks of all those exposed.

(5) LEVELS OF TOXIC METALS IN THE ENVIRONMENT—THE MANTARO WATERSHED

The Mantaro upper and middle watershed is one of the most important agricultural production areas of the Andes. It is the main producer of hydroelectric energy for the region; it is endowed with natural habitats for important biodiversity, and it is a home for 700,000 people. La Oroya is located approximately in the center of the Mantaro watershed at the confluence of the Yauli river and the Mantaro, the principal river of the watershed.

After Saint Louis University reported the results of its "Environmental Contamination in the Homes of La Oroya and Concepcion, Peru, and its Effects in the Health of Community Residents" study discussed above, the Archdiocese of Huancayo invited the University to design and direct a comprehensive environmental assessment of the Mantaro watershed in response to concerns expressed by the people of La Oroya and other towns in the area about the extent and the impact of contaminants coming from the Doe Run Peru smelter.

Thus, in 2008-2012, the School of Public Health directed the "Mantaro Lives Again," a comprehensive environmental assessment of air, water and soil indicators in La Oroya and the Mantaro watershed. The purpose of this assessment was to measure the presence of toxic metals including lead, arsenic and cadmium in air, water and soil samples, and to evaluate their impact on public health and environmental quality. Following are summaries of the results of this study.

Soil assessment results.

A total of 10 metals were measured in soil samples. Peru does not have soil quality standards, therefore, Canadian soil quality standards were used to interpret results. Regarding lead, 49% of all sampling sites exceeded the Canadian standard. The highest level of lead was found in La Oroya Antigua, the area of La Oroya closest to the Doe Run Peru smelter. The levels of arsenic exceeded Canada's standard in all sampling sites. Lead and arsenic levels that exceeded Canada's standards were found not only in La Oroya but also in the upper Mantaro watershed near areas with active mining activities. Also, these metals were found in water used to irrigate the agricultural land of the Mantaro valley. This is of concern because lead can be absorbed by plants used for animal and human consumption.

Water assessment results

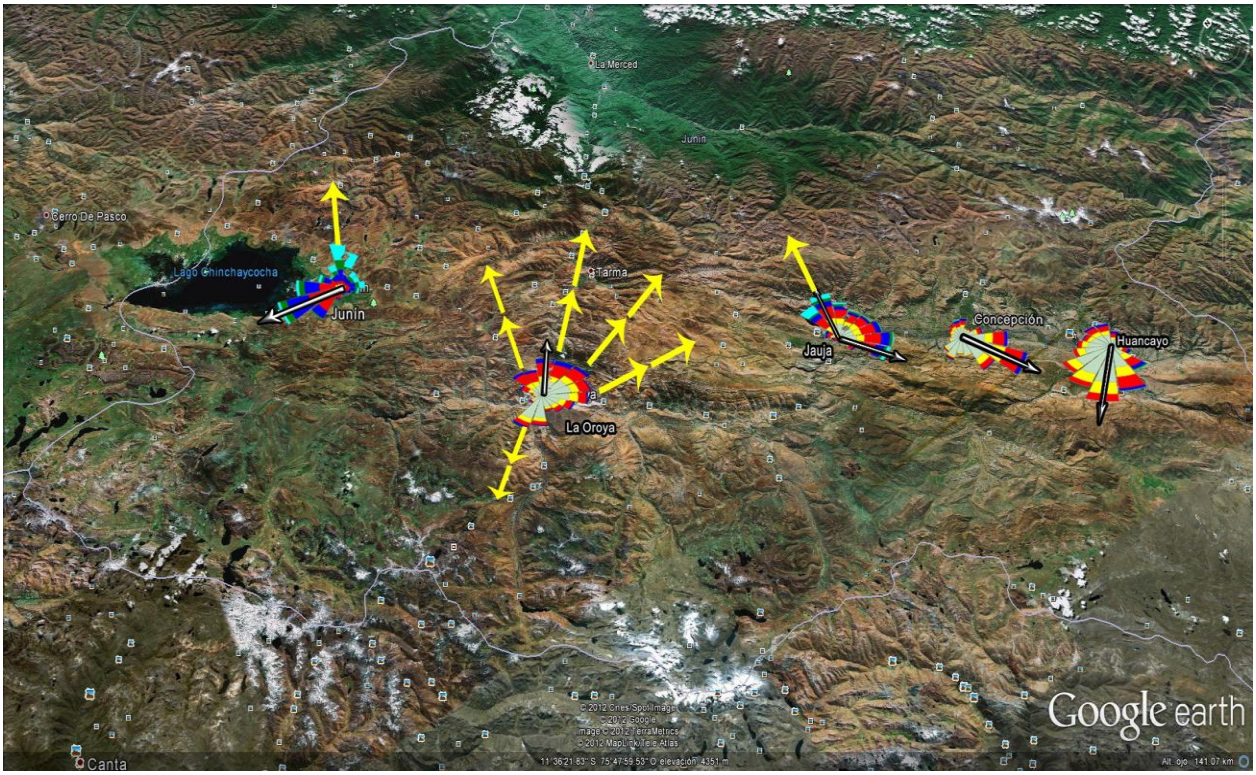
Water samples were obtained from 53 sampling sites in the upper and middle areas of the Mantaro watershed, as shown in the figure XX with the map below. Water samples were analyzed in laboratories in Lima, Peru and St. Louis, Missouri. The results indicate that there are only 8 streams left that are relatively free of contamination. The rest show varying degrees of contamination by lead, arsenic,

cadmium and other elements. Lead in the Mantaro river exceeded 20 times the Peruvian water standard and arsenic was 12 times over the Peruvianb standard at the La Oroya sampling by the Doe Run Peru slag deposit.

Air assessment results

Air quality indicators inclusind toxic metals and gases were measured in key points in La Oroya and other cities and towns in the upper and middle Mantaro watershed. Metereological parameters were also measured incluiding wind direction. Figure 7 belows shows how the winds originating in La Oroya spread contaminants such as lead, arsenic, cadmium, and sulphur dioxide (SO2) through the upper and middle areas of the Mantaro watershed.

Figure 7: Map of upper and middle Mantaro watershed showing wind direction from La Oroya.



Elevated levels of sulphur dioxide (SO2) and toxic metals such as lead, arsenic and cadmium were found in La Oroya. Most of these pollutants come from the main stack and fugitive emissions of the Doe Run Peru smelter in La Oroya. These pollutants are transported by the wind thereby affecting air quality throughout the Mantaro watershed. The levels of toxic metals and gases such as sulphur dioxide are of significant concern for the population not only of La Oroya but the entire Mantaro watershed.

The figures below compare the levels of lead, arsenic, cadmium and sulphur dioxide before and after the Doe Run Peru smelter stopped operating in July 2009. The levels of these contaminants before the smelter was closed exceeded significantly the Peruvian air standards. After the smelter closed, these levels fell precipitously. . Air monitoring showed a significant decrease of air pollutants after the closure of the Doe Run smelter in La Oroya in July 2009. SO2 decreased by 99%; lead decreased by 98%; arsenic decreased by 99%; and cadmium decreased by 93%.

Since the smelter closed the people of La Oroya have breathed much cleaner air for the first time in decades.

Figure 8: Map of the upper and middle Mantaro watershed with wind directions from La Oroya and other towns.

Figure 9: Sulphur dioxidse emissions from the Doe Run Peru smelter before and after the closing of the smelter in July 2009.

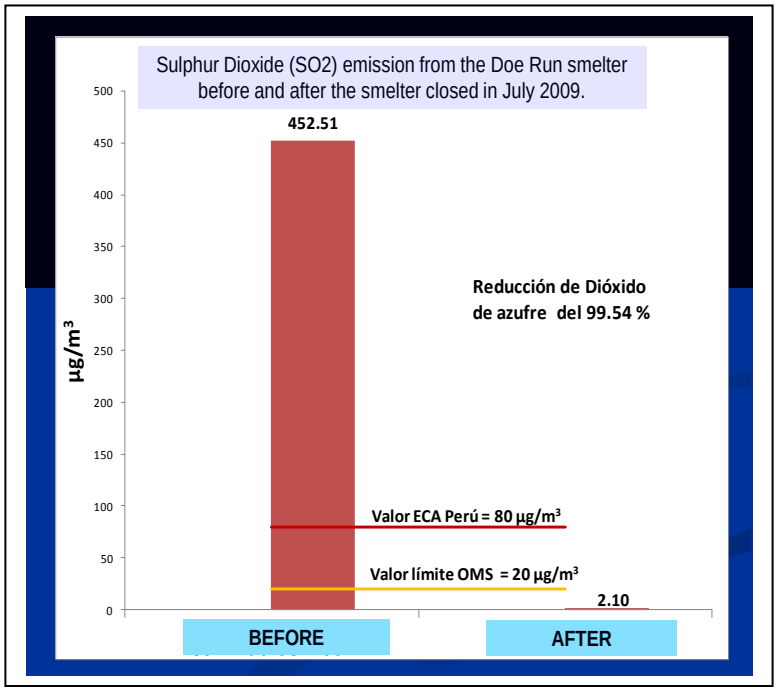
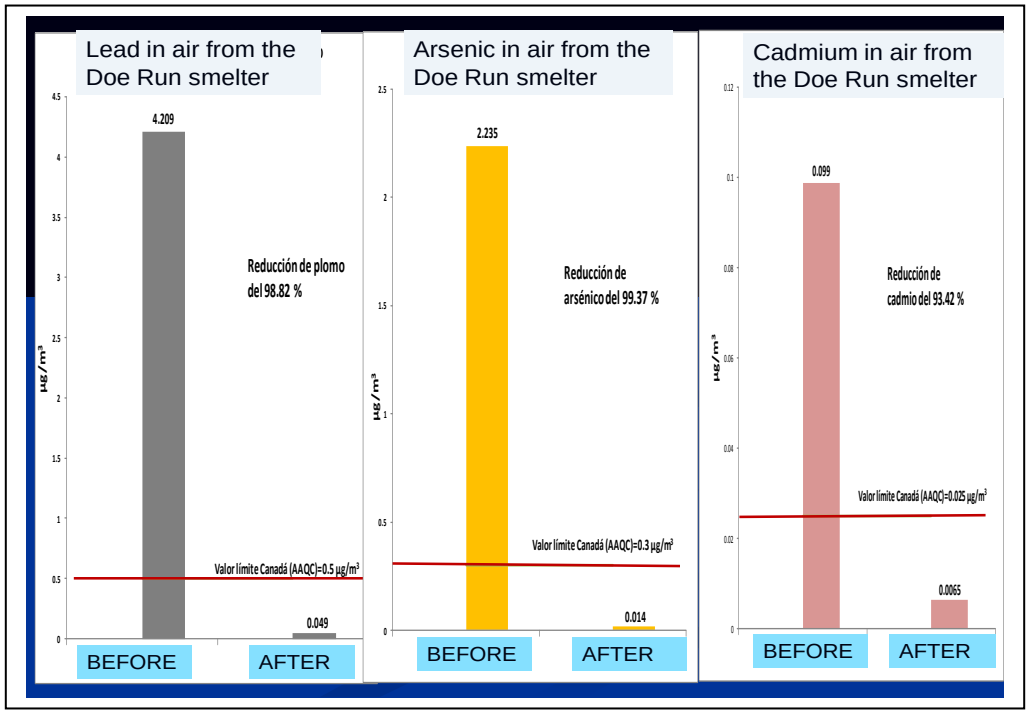


Figure 10: Comparisons of air levels of lead, arsenic and cadmium before and after the closing of the Doe Run Peru smelter.



The significant decrease of blood lead levels in La Oroya can be attributed to the drastic decrease of lead in air in La Oroya. Nevertheless, although the air is cleaner in La Oroya, health risks persist due to the contamination of water and soil by toxic metals and to the effects of chronic exposure to lead in La Oroya population. There are still numerous children with elevated blood lead levels, and more so now that the CDC has lowered the definition of elevated blood lead level to 5 µd/dL or greater. This is probably the result of the lead that has historically accumulated on the dust and the soil before Doe Run Oeru began operating its smelter in 1997. Nevertheless, Doe Run Peru remains responsible for the soil contamination that occurred after 1997.

- Air pollution has decreased significantly after the Doe Run Peru smelter closed in July 2009. As a result, elevated blood lead levels in children have decreased to levels never seen before since childhood lead screening began in La Oroya.
- However, there are still children (and other age groups) still with elevated blood lead levels probably due to lead in soil and dust in La Oroya.
- Nevertheless, although the air is cleaner in La Oroya, health risks persist due to the contamination of water and soil by toxic metals and to the effects of chronic exposure to lead in La Oroya population.

(6) RECENT EVIDENCE OF BLOOD LEAD LEVELS IN LA OROYA

The “Mantaro Lives Again” project has tested children for lead in La Oroya from 2007 through 2011. The children tested constitute a small sample not statistically representative, but that nevertheless indicates some trends in the variations of blood lead levels, as shown below in figure 11.

Figure 11: Variations in blood lead levels in children in the Mantaro Lives Again project

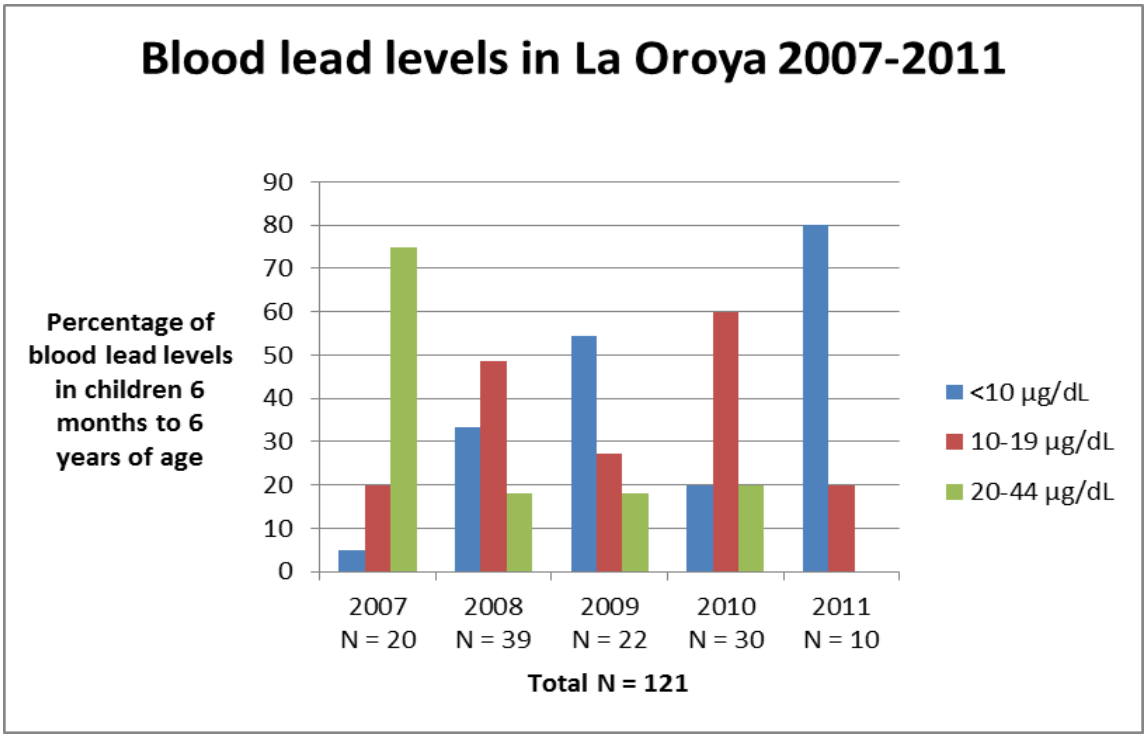
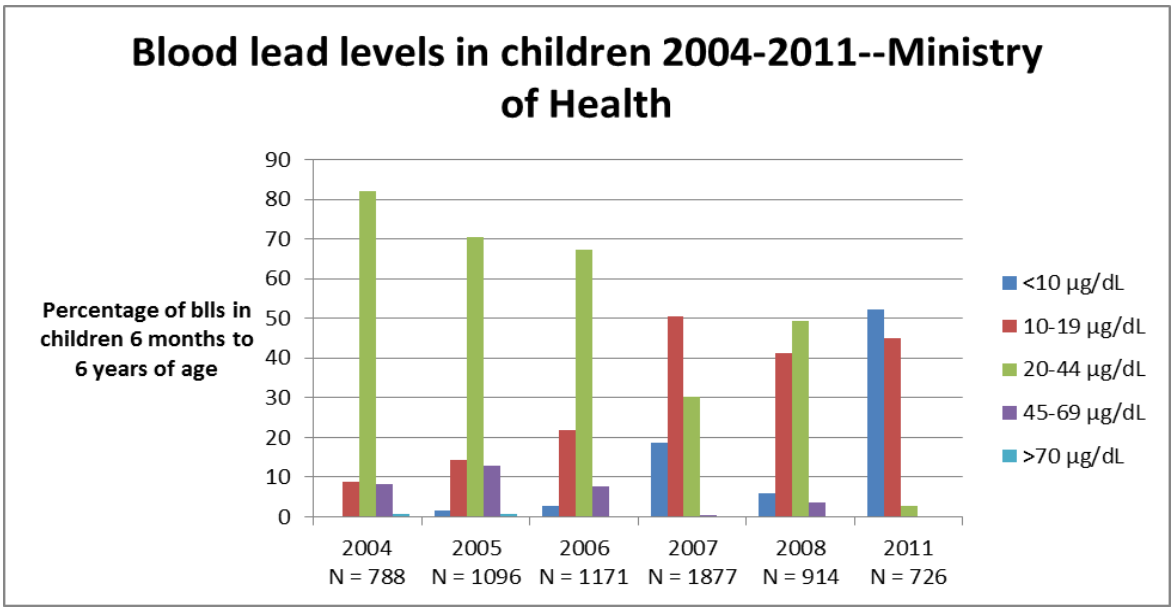


Figure 11 above indicates that elevated blood lead levels in children 6 months to 6 years of age decreased in the period 2007-2009 in categories II (10-19 µd/dL) y III (20-44 µd/dL), and increased in category I (less than 10 µd/dL).

After the Doe Run Peru smelter closed its operations in July 2009, blood lead levels in children increased in category II (10-19 µd/dL) en 2010. This may be due to the release of lead stored in bones back into the blood stream (lead accumulates in the long bones as a result of chronic exposure).
However, all elevated blls fell significantly in 2011. For the first time since blood lead screening in children began in La Oroya’s 80% of children are below 10 µd/dL, the CDC and Peru’s level of concern. This can be attributed to the drastic decrease of lead in air in La Oroya.

Figure 12: Blood lead levels in children by the Ministry of Health.



The Ministry of Health of Peru has screened children for blood lead in La Oroya every year since 2004 through 2011, with the exception of 2009 and 2010. Figure 12 above shows that elevated blood lead levels decreased in the period 2007-2011 in categories III (10-19 µd/dL) y IV (20-44 µd/dL), and increased in category I (less than 10 µd/dL) except in 2008.

Also, blood lead levels increased steadily in category II (10-19 µd/dL) in the period 2007-2011.

In 2011 elevated blood lead levels fell significantly in category III (20-44 µd/dL). Category II remained stable in comparison with 2007 and 2008.

Over 50% of children were below 10 µd/dL (the former CDC level of concern) in a sample of over 700 children screened by the Ministry of Health in November 2011.

However, there is a sizable percentage of children in the 2011 screening (43%) that still have elevated blood lead levels probably due to remaining lead in soil and dust in La Oroya. How many more children who now would be considered to have an elevated level (equal or greater than 5 µd/dL) could not be calculated because the Ministry of Health has not provided all screening data.